October 19, 2001

Fermilab

BEAMS DIVISION/CRYOGENIC SYSTEMS
ENGINEERING and DESIGN GROUP

Minutes from Thursday, Oct 18th Muon Collider/Cryogenics Meeting

Place: Outfield Conference Room, MW9
Attendees: Milorad Popovic, Alex Martinez (part-time), Barry Norris, Christine Darve, Arkadiy Klebaner, Del Allspach

Minutes Prepared by: Barry Norris

The following approximates the sequential conversation. Please note, there were only Fermilab attendees at this meeting.

- Milorad asks about the use of the tank that was shown on Ed Black's schematic previously shown at meeting on Oct. 12. Questions of its' size and necessity were spoken. Is it possible to vent into the air? Del made a point to say that the hydrogen had to be vented outside of the target hall. No release would be allowed in building. We seem to agree that hydrogen can be vented directed – at least in theory.

- Tank question led to need to discuss instabilities related to the hydrogen breathing. Arkadiy notes we must have a gas buffer to allow for the hydrogen system to breathe. It could be much smaller than Ed show's however.

- After some discussion we seem to come to an agreement that the vacuum space must be 52X the liquid volume. The gas buffer tank can be much smaller than shown by Ed. How small we don't know....we will have to size. Norris comments it seems that the system needs to breath +/- 2.5% in density. That is a place to start when considering the ultimate size as well as the total LH2 volume.

- Arkadiy has also proposed having a liquid hydrogen reservoir in the system. This is something SLAC noted to Norris/Klebaner when they visited in Sept. They do not have such a control feature but wish they did.

- Arkadiy inquires as to the dangers of venting hydrogen gas. Del talks of the Fermilab Flammable Gas Standard. He mentions that at CDF they have a 3 meter circumference around the vent area. In that case, the vent is in a radiation area. We must guarantee there is no smoking and no electrical ignition source.

- Norris asks what the possible impact of this facility might be when you consider the High Rise location. How can we guarantee the hydrogen diffuses under scenarios of high winds or other weather situations? There is a need to understand what the Standards require. Del says this will flush out the answer to any fear we have about venting. Flammable gas standard mostly addresses Ethane but it should be adequate for hydrogen.

- Del promises to personally review the Fermi standard as well as NFPA to understand proper venting requirements.

- It is noted that John Wiesend (SLAC) is coming to Fermi on Monday. We will meet with him to understand his viewpoints.

- Buffer arrangement: Tank will connect directly to circuit as a breathing mechanism with no check valves.

- Del points out that the existing standard speaks about a common vacuum for the heat exchanger portion and the absorber. This could change for us but we will need to adhere to standard in other area for each vacuum space if we split it.
- There was a discussion about whether we need to write a new standard for absorbers since existing standard is specifically for targets. Jim Kilmer had mentioned to Arkadiy this could be necessary. Del believes we use the target standard and address differences as we go along.

- There must be an effort to understand how we cool this future system down. This will help with understanding the buffer tank needs etc.

- Christine asking Milorad about the Solenoid bore size and what the cryostat/absorber might physically look like. Milorad drew what he presently understands as a possible arrangement but ***it is quite clear we need an exact geometry in the very need future from the experimenters. Until this issue is flushed (especially the pressure drop of the absorber), Cryo will be unable to proceed in an efficient manner.***

- Cryo is going to layout a proposed hydrogen schematic that will be a counter proposal to what Ed has shown.

- There is a real need for us to understand the pump characteristics. Weisend can add insight to this.

- Del makes a point that there needs to be 2 separate reliefs on the supply circuit (hydrogen). One of the 2 will be a rupture disc.

- Key issue was then brought to the table: Del told us that the Target hydrogen standard dominates over the other ES&H and/or ASME standards we normally hold to in our other cryogenic projects. Del says that no engineering note needs to be done for the absorber vessel! Arkadiy questions reality of this in terms of the physical size and volume of previous vessels vs. the absorbers. Del speaks of the standard addressing this very concern.

- The meeting ended with a comment by Del that he was worried about the relieving characteristics of the absorber if the "nozzle" flow system was used. ***This Cryo team needs to see a drafting layout of the proposed cooling scheme for the absorber.***

NEXT MEETING: THURSDAY, OCT 25 at 9am in MW9